

Litter size in Norwegian White Sheep



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Stabilize litter size

The Norwegian White Sheep breed is prolific with a mean litter size of 2.33. A major gene increases both the mean and the variance in litter size. We now aim to stabilize litter size at this mean and reduce the variance.

Introduction

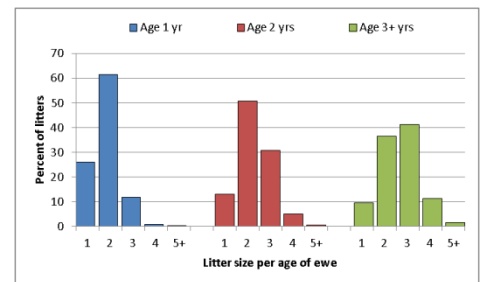
The breeding goal has included litter size since the 1960s. Crossbreeding with Finnish Landrace in the 1970s enabled us to both mate the ewe lambs the first autumn, as well as boost litter size. Genetic gain in litter size over the past ten years has been 0.2 lambs.

Litter size depends on age

Data for the ram circle members with Norwegian White Sheep (NWS) was retrieved from the Norwegian Sheep Recording System. Lambing data from ewes older than six years was discarded. The mean litter size in 2015 was 2.33. One year old ewes had the lowest mean (1.88), increasing the second year (to 2.29), while older ewes had the highest mean (2.59).

Twins are the most frequent litter size for one year old ewes, while triplets are slightly more frequent than twins for ewes three years of age, or older.

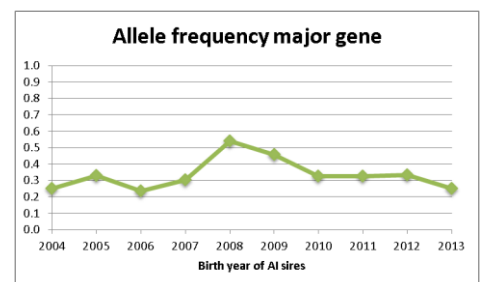
Norwegian farmers discuss the optimal litter size, but agree that litters larger than two on yearlings and larger than three on older ewes is undesirable.



A major gene from Finnish Landrace

In 2011 we realized that a mutation in the GDF9 gene (c.1111G>A or V371M) is associated with an increase in litter size. The mutation increases the litter size by approximately 0.3 lambs per copy of the allele. The variance in litter size increases with the mean.

850 ewes from flocks with both a high genetic level for litter size and phenotypically large litters were genotyped. 54% of the three year old ewes with two copies of the allele had quads or larger litters (42 out of 78 ewes). Due to this, we will try to restrict the allele frequency of this major gene in the population.



Since 2013, potential AI sires carrying two copies of the mutation have been discarded. The genotype is stated for all rams that have been genotyped, so that breeders can choose not to use rams carrying this major gene. Together with decreasing emphasis on litter size in the total merit index since 2007, we hope to avoid increasing the frequency of this major gene.

Conclusion

Mean litter size is 2.33. At least eleven percent of litters born in 2015 are considered overly numerous. We now aim to maintain the mean litter size unchanged, yet reduce the variance. Therefore, little emphasis is assigned to litter size in the total merit index. Also, AI sires have a maximum of one copy of the major gene affecting litter size.

